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A REPORT ON IMMUNISATION EXPERIMENTS AGAINST NEWCASTLE DISEASE USING CRYSTAL VIOLET VACCINE

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During a large amount of experimental work with the fowl-passaged virus of Newcastle disease, in an attempt to produce a satisfactory immunising agent, no useful results were achieved. Attention was then directed to the possible control of the disease by vaccines prepared from the egg-cultivated virus. It has been shown that 14 to 33 serial passages through the developing hen's egg were necessary before the virulent fowl virus was sufficiently attenuated to be safe for use as a vaccine, Iyer and Dobson (1940). Following the cultivation of the virus in eggs, in order to explore the possibility that it might be rendered more suitable for the preparation of a vaccine, it was decided to study the immunising value of the virus cultivated through the egg for different generations and subsequently treated with crystal violet.

The idea of employing the crystal-violet vaccine for Newcastle disease as an immunising agent was derived from the almost similar experimental work on the control of swine fever by Dorset and his associates. These workers, using crystal violet as an agent for the attenuation of the virus of hog cholera, obtained satisfactory results. McBryde and Cole (1936), Munce (1937), Hupbauer and Tomasec (1937), and Edgington and Schalk (1939) tried the crystal-violet vaccine for hog cholera, and it would appear from their reports that the method has given variable results in the hands of different workers; it is clear, however, that, with certain improvements in the physical and chemical nature of the vaccine, success may be achieved.

PREPARATION OF VACCINE

Each lot was prepared as follows :—

Virus.—The first passage of the virus in eggs was effected by the inoculation of a Berkefeld V filtrate of a 1 per cent. emulsion, in saline, of half and half of liver and spleen, representing the English strain of fowl-passaged virus. In this connection, it seems necessary to mention that the rapid serial passage of the virus through highly susceptible fowls during 15 months did not appear to alter its virulence or the nature of the experimental disease, so as to cause it to resemble fowl plague, as reported by Manninger (1932 and 1936). Doyle (1935), however, proved beyond doubt that Newcastle disease, although bearing a superficial resemblance to fowl plague, is a separate entity, differing in its period of incubation, symptoms, pathological lesions, pathogenicity for pigeons, and lastly, immunologically. Further, Burnet and Ferry (1934) have demonstrated that the two viruses are distinct, as shown by their different sizes determined by the Elford formula, and in regard to their growth and other characteristics on the chorio-allantoic membrane of the developing hen's egg.

In the preparation of the vaccine against Newcastle disease, two or more dead embryos, showing sharply outlined haemorrhages as a result of the artificial infection with egg-cultivated virus, were minced with quartz powder and emulsified in normal saline to give a concentration of 10 per cent. tissue suspension by weight. The virus solution was rendered cell-free by centrifuging at 500 r.p.m. and pipetting off the supernatant fluid. Fresh unpreserved virus was used in all the experiments.

Vaccine Mixture.—To eight parts of the virus suspension as detailed above were added with sterile precautions one part of 3 per cent. aqueous solution of dibasic sodium phosphate, freed from moisture by freshly drying to constant weight at 110° C., and one part of 0·5 per cent. aqueous solution of crystal violet of commercially high purity (the dye was labelled G. T. Gurr & Co., London). The dye being somewhat difficult to dissolve, the solution was made by thorough digestion with hot water. The vaccine mixture was attenuated at 37° C. for 72 hours and then tested bacteriologically after suitable dilution, to minimise the bactericidal effect of the dye. All the lots of vaccine have remained free from bacteria, and were tested in fowls. As a rule, a dose of 5 c.c. of the vaccine was injected under the skin.

Birds.—Fowls of varying ages, and of different breeds and sex, were used for testing the vaccine. A suitable number of controls was also included. The birds were housed in individual coops or in pens, depending upon the experiment.

Immunity Tests.—At different periods after vaccination, immunity tests were made on the vaccinated fowls by the subcutaneous injection of fowl-passage virus of known virulence or by pen-contact exposure to the same virus, the former method constituting a much more severe exposure than would occur under natural conditions. Owing to the severe nature of

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the immunity tests, it was but reasonable to assume that, if any fowls survived, the results would be most favourable to the vaccine. Fowls used as controls for the immunity tests died within the usual period in all cases.

Results

Immunisation tests were carried out with six lots of the crystal-violet vaccine as shown in Table I. In all, 51 fowls of different ages and breeds received the vaccine treatment and remained well, but, following the immunity test, 30 died. The remaining 21 which survived are still under observation, and have remained well, and the young birds have grown normally.

In the case of the first lot of vaccine, fowl No. 2137 was submitted to the immunity test, about two months after vaccination, by contact infection; it died on the fifth day. Presumably the virus after 12 serial egg passages was not sufficiently modified in its virulence to produce an efficient vaccine.

Two fowls inoculated with the second lot of vaccine resisted experimental infection with two graded doses of the fowl passaged virus, the first dose being given on the eleventh day—this suggesting that the immunity may be established as early as eleven days

Table I

Immunising value of crystal-violet vaccine against Newcastle Disease

Vaccine lot No.	Date of vaccination.	Virus used for vaccine preparation.	Fowl No.	Result of vaccination.	Immunity test with fowl virus No. of days after vaccination.	Result.
1	8.2.40	Passage 12 egg virus	2137	Remained well	54 (contact infection)	Died 5th day
2	29.3.40	„ 23 „	2878	„ „	11 and 24	Survived
			2879	„ „	11 and 24	„
3	2.5.40	„ 33 „	2273	„ „	14 (contact infection and 36-100 million M.L.D.)	„
			2274	„ „	„ „	„
			2275	„ „	„ „	„
			2276	„ „	7	Died 4th day
			2278	„ „	14	Survived
			2277	„ „	21	„
			2287	Left in contact with vaccinated fowls	14 (contact infection)	Died 6th day
4	27.5.40	„ 41 „	2332	Remained well	21	Died 2nd day
			2329	„ „	25	Survived
			2333	„ „	25	Died 6th day
			2323	„ „	28	„ 4th „
			2324	„ „	28	„ 4th „
			2334	„ „	28	Survived
			2325	„ „	32	Died 5th day
			2326	„ „	32	Survived
			2328	„ „	32	„
			2330	„ „	32	„
			2327	„ „	32	Died 5th day
			2331	„ „	32	Survived
5	29.8.40	„ 56 „	2525	„ „	14	Died 4th day
			2526	„ „	14	„ 4th „
			2527	„ „	14	„ 4th „
			2528	„ „	14	„ 4th „
			2529	„ „	14	„ 4th „
			2530	„ „	14	„ 4th „
			2531	„ „	14	„ 4th „
			2532	„ „	14	„ 4th „
			2533	„ „	14	„ 4th „
			2534	„ „	14	„ 4th „
6	12.10.40	„ 23 (line 2) „	Mature hen 2692	„ „	13	„ 8th „
			Cockerels 20 weeks old 2695	„ „	13	Survived
			2696	„ „	13	„
			2698	„ „	13	„
			2693	„ „	13	Died 3rd day
			2697	„ „	13	„ 4th „
			4 weeks old chicks total No. vaccinated 14	All remained well	13	9 chicks died from 3rd to 8th day and remaining 5 chicks were immune

Controls were used for each group to test the activity of the virus used for the immunity tests. All these fowls died between the 2nd and 7th days following inoculation.

after vaccination. Owing to the encouraging results obtained with this vaccine, it was presumed that the virus, after 23 serial passages through the egg, had acquired certain new antigenic properties warranting further trials.

Several points of interest and value emerge from the results of tests with the third lot of vaccine. One healthy fowl (No. 2287) was left in contact with six vaccinated fowls for a period of two weeks. This fowl remained well, but, when exposed to contact infection with the virulent fowl virus on the 14th day, it proved susceptible and died. Three of the vaccinated fowls were exposed to a similar infection and all survived. Finally, their immunity to experimental infection with the fowl virus was confirmed. From the remaining three vaccinated fowls the information was gained that seven days after vaccination there was no immunity, but that it was solid on the 14th and 21st days. Further, it was observed that the vaccination was followed by no undesirable reaction in the fowls, and there was apparently no constitutional disturbance in any of the birds which were later found to have been successfully immunised.

The results with the fourth lot of vaccine were, however, unsatisfactory, and no definite conclusions could be drawn. Twelve mature fowls were used in this experiment, and the immunity tests were made from 21 to 32 days after vaccination. Only six fowls survived the immunity test. Seven healthy susceptible fowls (not shown in Table No. 1) were placed in the same pen as the vaccinated fowls, with common food and watering troughs. None of these fowls became sick, suggesting that the vaccine contained no unmodified virus. In considering critically the various conditions which might affect the successful employment of this method of vaccination against Newcastle disease, the exact period of contact of crystal violet with the virus seems to be a most important factor, for in this case owing to an intervening Sunday the vaccine was stored for a day in the refrigerator (0° C.) in addition to the usual period of incubation for 72 hours at 37° C. This may have resulted in the deterioration of the vaccine to a certain extent. Hupbauer and Tomasec (*loc. cit.*) employing the crystal-violet vaccine for swine fever, reported that the immunity conferred was in inverse proportion to the attenuation of the vaccine and proportional to the reaction it caused; further attenuation of the virus continued as long as the vaccine was kept at atmospheric temperature.

With a view to repeating these experiments on a larger scale, before the value of crystal violet in the preparation of a vaccine against Newcastle disease was assessed, two more lots of the vaccine were prepared and tested in fowls.

Vaccine Lot No. 5.—Ten 12-weeks old White Leghorn cockerels were inoculated with this vaccine, and when tested for immunity on the 14th day, all died. Perhaps the age at the time of vaccination may be an important factor for consideration.

Vaccine Lot No. 6.—In this experiment one mature Rhode Island Red hen, five White Leghorn cockerels, 20 weeks old, and 14 chicks, four weeks of age, were used as test birds. The dose of the vaccine, and of the fowl virus for the immunity test, was proportionately reduced for the chicks. Although the vaccination was followed by no reaction, there was a considerable individual variation in the response of these birds to their subsequent infection with fowl virus, 13 days after the vaccine treatment. This vaccine conferred no immunity in the mature hen, two Leghorn cockerels and nine chicks, but, however, three cockerels and five chicks withstood the immunity test.

DISCUSSION

Considering the results of all these experiments, only lots Nos. 2 and 3 appeared very promising, and showed what might be considered as a successful attempt at vaccination against Newcastle disease. The virus after cultivation in eggs may have acquired some new property which rendered it safe and efficacious for the preparation of a vaccine, thus paving the way for a useful line of further research following the modern concepts of the chorio-allantoic method of virus-culture. At this stage, with the limited experiments and observations, it would be impossible to assume that the vaccine was free from any unmodified virus.

When these experiments were repeated on a larger scale, the results, on the whole, were irregular and unsatisfactory, and warranted no further trials with crystal violet for the attenuation of Newcastle virus. Indeed, with one lot (No. 5) of vaccine, out of the ten fowls vaccinated, none survived the immunity test, suggesting that there may be several factors which require to be considered for the successful employment of this method of immunisation.

In summing up the results of this work, it was considered that further trials were unjustified. We have been unable to obtain uniform results with the crystal-violet vaccine for Newcastle disease, comparable to those reported by the American workers in their investigation of the control of hog cholera.

Summary

During a large amount of immunological work with the fowl-passaged virus of Newcastle disease, no useful results were achieved. Following the modern concepts of the chorio-allantoic method of virus-culture, in an attempt to develop a suitable preventive treatment, six lots of crystal-violet vaccine were prepared from the virus after varying numbers of passages through developing chick embryos. In all, 51 fowls of different ages and breeds received the vaccine treatment and remained well, but, following the immunity test with virus of known virulence, 30 died and the remaining 21 which survived have grown normally. Owing to the irregular and unsatisfactory results obtained with this method of vaccination, no further trials were made.

References

Burnet, F. M., and Ferry, J. D. (1934.) *Brit. J. exp. Path.* **15.** 56-64.

Dorset, M. (1935.) Report of the Chief of the Bureau of Animal Industry for the year ending the 30th June, 1935, U.S.A.

Doyle, T. M. (1935.) *J. comp. Path.* **48.** 1-20.

Edgington, B. H., & Schalk, A. F. (1939.) *J. Amer. vet. med. Ass.* **94.** 501-509.

Hupbauer, A., and Tomasec, I. (1937.) *Vet. Arhiv.* **7.** 484-490.

Iyer, S. G., and Dobson, N. (1940.) *Vet. Rec.* **52.** 889-894.

Manninger, R. (1932.) *Arch. wiss. prakt. Tierhlk.* **65.** 256-265.

———. (1936.) *J. comp. Path.* **49.** 279-283.

McBryde, C. N., and Cole, C. G. (1936.) *J. Amer. vet. med. Ass.* **89.** 652-663.

Munce, T. W. (1937). *Ibid.* **90.** 304-321.

The Livestock Industry of Eire and some familiar Contagious Diseases of Animals*

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The livestock industry occupies a key position in the agricultural economy of Eire—the cattle exports being the biggest single item we have. Its importance is only fully realised when we examine the exports of the produce and manufactures of the country for any one year.

The values of the annual exports of livestock from Eire into Great Britain in normal times have been approximately as follows: cattle 13½ millions; sheep and lambs over 1¼ million; swine 2 millions; horses 1¼ million and poultry over half a million.

The trade in livestock between this country and Great Britain exceeds in volume that between any other two countries. Our principal market has always been Great Britain, and this market, which is so near to us, is sought after by every country in the world which has a surplus of livestock products to export.

The high tariffs and quantitative restrictions imposed during the so-called economic war from July, 1932, to May, 1938, severely depressed the trade. We have felt the loss of the British market on other occasions when the British authorities closed their ports temporarily owing to outbreaks of foot-and-mouth disease in this country. Fortunately such outbreaks are of comparatively rare occurrence here, and the relatively clean bill of health amongst our livestock has contributed in no small degree to the continued steady flow of surplus stock from the country.

The Store Cattle Trade of Eire with Great Britain represents the system by which our farmers raise store cattle for finishing by English and Scotch feeders and ensures for the latter a steady and continuous supply of suitable cattle—which are first-class raw material for beef production, and which cannot be obtained elsewhere.

It is of primary importance to farmers in Great Britain that a reservoir of these store cattle should be available here, especially in times of emergency. This is a big material asset to this country, although we must always realise that the English cattle producer will first be catered for by the British Ministry in competition with our exports.

We, as custodians of animal health, should be very intimately connected with every aspect of the production of livestock for export. Consequently, we should be very vigilant as to happenings across Channel, owing to the vulnerable nature of our economic situation, particularly during war-time.

The Livestock Industry Bill became law in Great Britain and was designed amongst other things for regulating the importation of livestock and meat into that country and also for the development of the livestock industry there. Consequently, the cattle population of Britain is to-day of greater importance than it has ever been before.

Since the European conflict began, Great Britain is now the sole buyer of our large surplus of animals. But there are two factors we must recognise: that this market is at present abnormal, and that any surplus in excess of the requirements of any particular market is likely to result in a fall in prices in consequence.

This is all the more reason why, as a profession, we should be a guide as to the methods of improving the standard of our animals, so that the loss in price would be made up by improving the quality of our exported livestock.

It is generally admitted that, since the introduction of the *Livestock Breeding Act*, 1925, there has been a marked improvement in the type and quality of the cattle bred and exported from Eire. The livestock policy of the Department of Agriculture has been directed towards ensuring that dairy cows of the dual-purpose Shorthorn type should constitute the major portion of the dairy cattle of the country. The licensing standard for bulls of the Shorthorn, Hereford and Aberdeen-Angus breeds has been gradually raised without causing hardship to farmers or breeders. The use of these high-class bulls throughout the country has resulted in ensuring a good all-round standard of quality in the store cattle available for export.

Similarly, the *Horse Breeding Act*, 1934, has undoubtedly helped to improve the quality of our horses. Antiquated methods are of no avail to-day, and we must take full advantage of our unique climatic and soil conditions by having efficiency in the breeding, rearing and feeding of our animals. I have witnessed thousands of our horses being shipped from Dublin Port to continental countries pre-war, and the officers and buyers of these animals were always enthusiastic in their praise of the superiority of our Irish horses.

We are all aware that the fame of the Dublin Horse Show extends to every known part of the world where horseflesh is appreciated. Our bloodstock is one of our greatest industries, capable of enormous and world-wide development. The fame of our horses rests on solid achievements and unquestioned excellence. The veterinary profession is proud of these facts, as we are the guardians of the health of these animals, and other countries are jealous of our high standard of quality, and of our clean bill of health. This little country being an island, the sea helps to prevent the introduction of disease, and makes it possible for us to take more effective measures for dealing with contagious and infectious diseases.

Legislation has proved itself an efficient educator concerning some of these contagious and infectious diseases—the control and prevention of which concerns the ordinary farmer. The Diseases of Animals Acts and Orders enable the Minister for Agriculture to take measures for the suppression of contagious disease in this country, and to prevent the introduction and spread of disease from abroad.

Through the efforts of the veterinary profession most of the terrible scourges known in the past are now completely eradicated. The prevalence of other diseases, however, continues to engage the attention of the profession, demanding the utmost vigilance as to preventive measures—the following particularly: anthrax, bovine tuberculosis, sheep scab, swine fever and, of course, foot-and-mouth disease.

These are all notifiable diseases, and the responsibility rests with the owners of the animals and veterinary practitioners to report disease or suspected disease, and failure to comply with this essential duty renders the offender liable to many penalties.

As you are all well aware of the nature and importance of these diseases, I do not think it comes within the

* Presidential Address to the Veterinary Medical Association of Ireland, at the Annual Meeting held in Dublin, January 31st, 1941.

scope of my address to refer more than briefly to any of them. [The speaker then reviewed, in summary, the position in regard to certain diseases, such as foot-and-mouth disease, anthrax, sheep scab, swine fever, and tuberculosis in cattle, and proceeded as follows.]

Large economic losses in farms may remain neglected because their extent has never been ascertained. The country is teeming with intelligent young farmers—these men should be made to realise the situation, so that we could count on their co-operation concerning the control of these diseases.

The practitioners should educate them in the knowledge that the principle of prevention applies to most of these contagious diseases, and that the key of control is the early recognition of the infected animal. The feeding of uneconomic cows is a great drain on the slender profits of farmers, and if they would only try, they could do much to prevent the spread of these diseases, and so materially reduce the economic loss of milk and meat to the country.

As to the control of these diseases, it is essential for the farmers to consult a practitioner, and the methods of control and the line of treatment to be adopted will depend on the nature of the cases, and the extent of the infection in the herd. This can only be determined by regular routine visits to the farms and by a laboratory diagnosis of the causal organisms. The farmer usually being ignorant of the cause of these losses, often sells valuable milk cows, thereby spreading disease to another herd, unless they are disposed of to the local butcher.

. . . . . .

I wish to close my address by making a special appeal to the members of the profession to join the Veterinary Medical Association, and attend the quarterly meetings, in order that they may have a voice in the proceedings.

This Association represents a body of many activities. It promotes and maintains the dignity and interest of the profession in this country. It exists for the advancement of veterinary science in all its stages of development, which is of as much vital importance to the welfare of the community as is any other branch of national life.

Without a strong and united front we cannot hope to ensure to future generations that rightful place that we should hold amongst the learned professions. We must, therefore, carry on the great tradition handed down by our predecessors, who commanded respect both inside and outside the profession.

I sincerely trust that during my Presidential year, with your generous support, and with the aid of a Committee the members of which are willingly and unselfishly using their ability to help the Association, we will carry on the good work that has been accomplished in the past.

Weekly Wisdom

After two hours' boiling the temperature in the centre of a large ham has only risen to 35° C.; after six hours' boiling to 65° C.; and it is only aften ten hours' continuous boiling that 85° C. is reached.—A. E. Shipley, "The Minor Horrors of War."

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A process to convert wheat, barley and oat straw into a more useful foodstuff for cattle has been developed by Imperial Chemical Industries, Ltd. A number of these plants are in operation on farms in various parts of the country.

THE VETERINARY RECORD
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THE AGRICULTURAL IMPROVEMENT COUNCIL FOR SCOTLAND

An Important Omission

SCOTLAND, with its rich lowland country and extensive uplands, is renowned for the high standard of its farmstock industry—a renown shared equally by the dairy farmer and the breeder of store cattle or sheep. Indeed, animal husbandry and its attendant problems find a very high place among the practices of Scottish agriculture. Nevertheless, as in all communities where the main industry is stock raising, there is room for improvement in the methods at present in vogue for the maintenance of animal health and the control of disease.

It might, therefore, have been assumed with some justification that any advisory body set up with the avowed object of improving the practices of Scottish agriculture would assuredly have included in its personnel a high proportion of veterinary representation, particularly when one remembers the high standard of veterinary research and practice in Scotland. Furthermore, it will be remembered that the Minister of Agriculture in announcing the formation of the English Council indicated that the Scottish Council would be on similar lines. Members of the profession and readers of this journal would certainly have expected such a representation when we had occasion so recently to express satisfaction with the personnel of the newly constituted Agricultural Improvement Council for England and Wales. On that occasion we even went so far as to intimate, albeit prematurely, that in our view the authorities would be unlikely, in future, to set up any committee which would have as part of its task the consideration of questions of animal health without including upon it one or more representatives of the veterinary profession.

Despite the obvious advantage to the Council which veterinary representation would have upon its constitution and work, the Agricultural Improvement Council for Scotland contains no member of the veterinary profession. It is difficult to understand how such an omission could have occurred when one realises the vital part which veterinary science must play in the deliberations of the Council and in the subsequent prosecution of its plans. It would indeed appear impossible for the Council to fulfil the terms of its remit without veterinary representation. We cannot but believe that as soon as the authorities realise their disastrous mistake they will take early steps to make good this omission, so that the Council's activities may flourish and the maximum of benefit be given to Scottish agriculture. For its part this Association is already taking active steps to assist the accomplishment of this end.

CLINICAL COMMUNICATION

Staphylococcal Haemorrhagic Prostatitis in the Dog

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Subject.—Black cocker spaniel, aged four years.

History, Examination and Treatment.—I was called out to see this spaniel late in the evening after it had been straining all day, apparently in an attempt to defaecate. The dog was restless and straining when I made my visit, and the abdominal muscles were very tense. Digital examination revealed the rectum to be full of hard faeces. The owner had given a good dose of castor oil during the day. The temperature was not taken. A large dose of liquid paraffin and a hot soapy enema was given with some degree of success. At a visit made the following morning, straining persisted, though not so frequently, and nothing had been passed overnight. The dog was very dull and would not stand on its feet for long at a time. The temperature was normal. The abdominal muscles were less tense. The bladder was about two-thirds full, and hard faeces were still present in the rectum. An enema was given with good results, but with no relief to the patient. Pressure on the bladder through the abdominal wall promoted straining and the bladder could not be relieved by this method: the owner was warned that something more serious than an impacted colon was being dealt with. Six hours later the dog was collapsed, but more faeces had been passed in the interim. The bladder could not be relieved by abdominal pressure and a catheter could not be passed into the bladder. Death followed about one hour after collapse.

Post-mortem Findings.—These were as follows:—

Kidneys: enlarged and congested.

Ureters: slightly enlarged.

Bladder: the contents were very deeply blood-stained—almost pure blood. The walls were thickened and intensely congested.

Prostate gland: enlarged, occluding the urethra, and showing haemorrhagic areas.

Pathological Examination.—The above-mentioned organs were submitted to the Research Institute in Animal Pathology (Streatley) for examination, and their findings showed the condition to be a staphylococcal haemorrhagic prostatitis with secondary spread to the bladder wall and then along the ureters to the kidneys. A haemolytic staphylococcus was isolated in pure culture from the prostate and from the kidney.

Remarks.—This is an interesting case, not only from the rarity of the condition but by reason of the fact that, as pathological examination showed, infection had been so acute that a simple inflammation had not had time to occur, but simply an acute destruction of capillaries. The dog was perfectly normal in every way until straining started, 36 hours before death, which was presumably due to toxaemia and uraemia.

ABSTRACTS

[A COMPARISON OF FLOTATION SOLUTIONS IN THE DETECTION OF PARASITE OVA IN FAECES. Koutz, F. R. (1941.) *Amer. J. Vet. Res.* **2.** 95-100.]

The author tested solutions of sodium nitrate, zinc sulphate, magnesium sulphate, sodium chloride and sugar, using direct flotation of the eggs for five and ten minutes, checked by the direct centrifugal flotation method of Clayton Lane. The solutions were prepared as follows:—

Sodium Nitrate (saturated solution). 850 grammes in 1 litre of distilled water is allowed to stand 24 hours at room temperature; some excess (25 to 50 grammes) is kept in the container undissolved to ensure saturation. Sp. gr. 1·400.

Zinc Sulphate. 1,000 grammes in 1 litre of distilled water at room temperature. Sp. gr. 1·380.

Magnesium Sulphate. The 62 per cent. solution recommended by Skriabine and Schulz (*see Vet. Bull.*, 1937. 7, 337). 920 grammes in 1 litre of distilled water at room temperature. Sp. gr. 1·285.

Sodium Chloride (saturated solution). 360 grammes in 1 litre of distilled water at room temperature, with some excess in the container to ensure saturation. Sp. gr. 1·200.

Sugar. The solution introduced by Sheather (1923. *J. comp. Path.* **36.** 71-90); 500 grammes in 1 litre of distilled water. Boil the water and pour it on to the sugar and stir. Koutz adds 1 per cent. (6·5 ml.) melted phenol crystals to preserve. Sp. gr. 1·275.

Dog faeces only were examined. A suspension of these was made by shaking 20 grammes faeces in 80 ml. distilled water, each 5 ml. of the suspension thus containing 1 gramme faeces. For direct flotation 5 ml. of the suspension was put in a vessel 5½ cm. high and 2½ cm. bore holding 21 ml., with 10 ml. of each of the flotation solutions described above. This was mixed thoroughly and more of the flotation fluid added until a convex meniscus appeared at the top of the vessel; over this a 3 × 1 inch slide was then slid, so that the top of the vessel coincided with a ring previously marked on the slide with a wax pencil. After 5 and 10 minutes respectively, the slide was lifted quickly off and the eggs on it were counted.

For direct centrifugal flotation 5 ml. of the suspension was stirred with each of the flotation fluids in a centrifuge tube of 18 ml. capacity; a coverslip was slid over the top of the centrifuge tube and it was spun for 2 minutes. The cover was then lifted off and the eggs on it were counted.

It was found that thorough mixing of the faecal suspension with the flotation fluid was very important, especially when the sugar solution was being tested. When sodium nitrate solution is used the stirring and general handling must be quick, because bubbles very readily form in this fluid. It also brings up so much debris that the eggs may be obscured and difficult to count. There was relatively little debris or bubbles in the sugar solution. Many thin-shelled eggs were crushed, especially when direct centrifugal flotation was used, and more were crushed in zinc sulphate than in any other solution. Errors in counts may arise from this cause.

Of the 45 dogs examined, ten were negative. The 35 others showed eggs of the nematodes *Trichuris*

vulpis (in 22 specimens), *Toxocara canis* (in six specimens), *Toxascaris leonina* (in three specimens), *Ancylostoma caninum* (in eight specimens), *Troglotrema salmincola* (in three specimens from dogs fed with salmon infested with this parasite and " taken after the animal showed symptoms of salmon poisoning "), the tapeworms *Taenia pisiformis* and *Dipylidium caninum* and the coccidia *Isospora bigemina* and *Isospora rivolta*. Figures of the egg counts are given, and the author concludes that the sodium nitrate solution gave the best results, although it floats up so much debris and forms so many bubbles that these may cause difficulties. It gave " a higher average and individual count of ova per gramme of faeces than any of the other solutions." It floated up the heavy eggs of *Trichuris vulpis* and *Troglotrema salmincola* in all samples, whereas the specific gravity of the other solutions was too low to do this always. Compared with the next best solution (zinc sulphate) it revealed ten times as many heavy eggs of *Trichuris vulpis*, eight to eleven times as many heavy eggs of *Troglotrema salmincola*, twice as many light eggs of *Ancylostoma caninum*, and more eggs of all the other species; it also floated up more oöcysts than the other solutions did, although all of them, except magnesium sulphate, gave good results with oöcysts. Sodium chloride was inferior for the detection of the heavier eggs, although it floated up the lighter ones, such as those of *Ancylostoma caninum*. Direct centrifugal flotation was always superior to direct flotation without the centrifuge. The author quotes Lane's claim, that it has an accuracy of 80 per cent. on the first spin. In sodium nitrate it sometimes brought up ten times as many eggs, and usually three to five times as many, as direct flotation without the centrifuge did, but even direct centrifuge flotation failed to float up the heavier eggs in sodium chloride.

[The author refers to the paper by Kalantarjan, E. V. [1938. *Med. Parasitol. & Parasit. Dis.* 7. 142-143 (abstr. in *Helminth Abstr.* 1938, 7. Pt. 3. No. 222d)], on the use of sodium nitrate in helminthological technique, but does not mention the work of Rebrassier (1940. *Cornell Vet.* **30.** 133-140), who also found that direct flotation with a saturated solution of sodium nitrate was better than it was with solutions of sugar, sodium chloride or magnesium sulphate, especially for the detection of the heavy eggs of *Trichuris vulpis*.] G. L.

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[**I.—IS FRIGHT DISEASE AN AVITAMINOSIS?** BERRYMAN, G., and SCHLOTTHAUER, C. F. (1941.) *N. Amer. Vet.* **22.** 34-38. (1 fig., 5 refs.).
II.—CANINE HYSTERIA: ITS RELATION TO DIETARY PROTEIN. SCHLOTTHAUER, C. F., and BERRYMAN, G. (1941.) *J. Amer. vet. med. Ass.* **98.** 33-35. (1 ref.).]

I and II.—It has recently been claimed that canine hysteria can be induced at will by feeding a diet deficient in vitamin B_1, while other workers (see *Vet. Rec.*, 1940, **52.** 326) have stated that the disease occurs when the diet contains heated proteins. The authors were unable to confirm either observation. Anorexia was developed in approximately 30 days after receipt of vitamin B_1 deficient diets, including an autoclaved commercial tinned dog food, but there was no evidence of hysteria even after several months on a deficient ration. It is stated that in previous studies one of the authors had frequently fed dogs for 10 to 12 weeks on a diet containing as little as 1 per cent. protein without any evidence of hysteria. In the present experiments, heat-treated diets were fed to eight young dogs without evidence of nervous symptoms, although in some cases there was an anorexia ascribed to lack of vitamin B_1 (destroyed during heat-treatment). A. N. W.

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[**FIBROSIS OF THE LIVER IN HEART FAILURE.** DAY, T. D., and ARMSTRONG, T. G. (1940.) *J. Path. and Bact.* **50.** 221-226.]

In all eleven cases of chronic passive congestion discussed by the authors a fibrosis of the liver was found, showing characteristic features on histological examination. New fibrous tissue was most in evidence around the branches of the hepatic vein and under the capsule. Both central and peripheral parts of the lobule were affected. In contrast to an inflammatory reaction, there was almost no cellular proliferation, either in regeneration of parenchyma, or in the stroma. Marked oedema was found, and it is suggested that this excess of tissue fluid predisposes to the production of extracellular fibrils under the stimulus of the local connective tissue cells. Thus partial stasis is held directly responsible for the observed lesions.

J. B. B.

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[**ON THE OCCURRENCE OF *BRUCELLA ABORTUS* IN WILD GAME ANIMALS.** WITTE, J. (1941.) *Berl. tierärzl. Wschr.* (1941). No. 11, pp. 128-130.]

Witte reports the isolation (the first time on record) of *Br. abortus* from a wild hare near Gleiwitz. The hare was observed to have lost the use of its hind limbs and was shot and sent for examination. There were subperitoneal harmorrhages in the psoas muscles and many subcutaneous abscesses around the chest. Cultures on many different media were made and rabbits and guinea-pigs were inoculated with pure cultures so obtained. All the results indicated that the organism was *Br. abortus*.

Witte discusses the significance of this discovery and quotes records of the finding of the infection in other wild animals, namely, bison and roe deer.

J. E.

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[**THE TOXICITY OF *SARTWELLIA FLAVERIAE* TO GOATS.** MATHEWS, F. P. (1940.) *J. agric. Res.* **61.** 287. (1 table, 1 plate).]

S. flaveriae is an annual yellow-flowered composite of the Helenium tribe growing in alkaline soils in semi-arid conditions. It is particularly prevalent in Texas and New Mexico. A serious loss of Angora goats which had been grazing on the plant led to the investigation. Goats which died on the range showed a gradual loss of appetite and later a distended abdomen. Autopsies revealed marked ascites, hepatic cirrhosis and some focal necrosis.

In all, ten goats were used in feeding tests. They were force-fed with either fresh or the dried plants according to the season of the year. The experimental feeding was not necessarily continuous, and periods of normal feeding often occurred between the experimental periods. The first evidence of toxicity was a diminished appetite followed, in two or three days, by refusal of all food. The appetite returned to normal in about a week if experimental feeding was discontinued. Some animals showed no ill effects; others died showing liver necrosis during the first course of feeding, whereas yet others died after or

during two or more feeding periods, with hydrothorax and pulmonary oedema.

The author points out that whilst his experiments have shown the plant to be toxic, there is nothing to indicate that the original losses in which hepatic cirrhosis was a notable feature, were due to *S. flaveriae*.

J. S. P.

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Errata.—"Tuberculosis in Dogs" (Lovell, R., and White, E. G. *Brit. J. Tuberc.* **34**. 117-133.) In the first two lines of this abstract (*Vet. Rec.* **53**. 373.) it is stated that 22, or 4·6 per cent., of the dogs examined were tuberculous: the 4·6 per cent. is correct but refers to 25 dogs in only 22 of which the organisms were typed. The age is stated to have ranged from twelve months to six months, whereas this should have been six months to twelve years.

REPORT

[**CITY OF JOHANNESBURG.** Report of the Director of Abattoir and Livestock Market Department, for the period July 1st, 1939, to June 30th, 1940.]

The Department is manned by a staff of 341, of whom 130 are white (45 temporary) employees, and 166 natives. Much of the first part of the Report deals with a report and recommendations from the General Purposes Committee to the City Council concerning the marketing of cattle, and in which recommendations are made regarding grading, and subsidy payments, so as to encourage top-grade cattle for local consumption. Government departments are the same the world over, and South Africa is no exception. The recommendations outlined by the aforesaid Committee appear to have been conveniently "shelved" for the time being.

During the year the approximate turnover in the Open and Quarantine markets was £3,062,472, and in the abattoir 900,622 animals were slaughtered, whilst 939 tons of meat was condemned. In the case of cattle, most of the meat seized was for extensive bruising, and measles. For mutton seized, causation was chiefly caseous lymphadenitis, emaciation, and bruising; for pork, measles, sarcocysts, tuberculosis, and bruising.

The municipality possesses 1,685 mules, 86 horses, and 286 oxen whose health and welfare is looked after by the Veterinary Department, or rather, by the veterinary staff of the Abattoir and Live Stock Department. The animals at the Zoo are also attended by the same staff, and autopsies performed as required. A cattle fattening scheme is also being run on one of the farms. The incidence of tick-borne diseases is under control, and although anaplasmosis assumed alarming proportions during the first year of this scheme, deaths throughout this year have been few.

The Assistant Veterinary Surgeon, Mr. E. J. Pullinger, B.Sc. (S.A.), M.R.C.V.S., reports on the inspection of 497 dairies, and 24,926 cows. Of 38 milk samples examined from 34 depots, involving the milk of 70 producers, only one was contaminated with *M. tuberculosis*, and four with undulant fever organisms. About 5 per cent. of the cows examined show evidence of past or present udder disease, and it is stated that laboratory examination would have revealed a far higher percentage of mastitis.

Twelve members of the director's staff are on military service.

D. J. A.

NATIONAL A.R.P. FOR ANIMALS COMMITTEE

An Informative Bulletin

We have received for publication the following short bulletin, issued in respect of the activities of the above organisation, and which furnishes evidence of much useful work in various spheres.

As our readers may be aware, the re-organisation of the Committee is now proceeding. This re-arrangement, we understand, is likely to enhance the importance of the national service now rendered in this field by veterinary surgeons throughout the length and breadth of the country.

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This is an entirely voluntary organisation entrusted with the care and protection of our animal population under war conditions, and composed of the Veterinary Profession, collaborating with the Animal Welfare Societies, the Ministry of Agriculture, Ministry of Food, National Farmers' Union and a vast number of voluntary helpers.

There are two branches of the organisation—the Technical and the Registration.

The Technical Branch

The main objects of N.A.R.P.A.C. are to provide for:—

1. The prevention and alleviation of animal suffering.

2. The protection of human beings from panic-stricken or gas-contaminated animals.

3. The conservation of animals of economic value, living or dead.

4. The provision and protection of food supplied for essential animals (transport and farm animals).

5. The furnishing of general information and advice to animal owners through its constituent members.

Although N.A.R.P.A.C. does not form a component part of the A.R.P. Department, nor share its resources, nevertheless it strives to work in close co-operation with it and, in great measure, is dependent upon its personnel for linking up and maintaining communication with Veterinary Central Controls.

There are some 1,500 veterinary surgeons in the organisation. This is a small number of professional men to cover the length and breadth of the country, but their numerical deficiency is counter-balanced by their formation into Mobile Veterinary sections; that is to say, the veterinary surgeon with his car and three or four trained assistants. Each Mobile Section is being equipped to render first-aid, decontaminate "gas" casualties, or humanely destroy animals fatally injured.

The Animal Welfare Societies have placed at the Committee's disposal their personnel, Clinic and Dispensary premises and equipment and, in addition, numbers of workers, trained by veterinary surgeons, serve at First-Aid Posts. These First-Aid Posts are provided with dressings and other necessary equipment.

N.A.R.P.A.C. at Work

From time to time notices have appeared in the public Press relating to the action of respective Societies during and after air raids, and although these notices oftimes contain no reference to N.A.R.P.A.C., the tending of the injured animals, the rescuing of the imprisoned and the evacuation of animals from dangerous zones is evidence of the Welfare Societies carrying out the duties assigned to them as constituent members of our organisation.

The work of the personnel of N.A.R.P.A.C. is fully appreciated, and veterinary surgeons, technical helpers, horse foremen and drivers, and many other lay workers—women as well as men—have not hesitated to carry out their work courageously and often to endanger their lives for the sake of animals—a fitting tribute to a nation in the hearts of whose people the welfare of animals has long held place.

It is noteworthy that many awards have been given to the members of our organisation for their prompt and brave actions.

The Registration Branch

This branch undertakes the registration of animals, especially of dogs and cats, and provides each with a disc on which there is an identification letter and number, the letter representing the district from which the animal comes. The use of the disc affords the only means of identifying the cat.

Some two and a quarter million dogs and cats have been so registered, and their registration has been the means of identifying large numbers of lost and strayed animals which have been returned to their owners. It has also been possible in the case of animals being killed or fatally injured, to inform owners that their pets have passed beyond all suffering.

Rural Areas

Provision has been made for the care and protection of the animals of economic value by extending the work of the Technical Branch to embrace the rural areas of the country. Veterinary supervision is now operative over each county, and communication between Veterinary Centres and the farming community is maintained by an army of Parish Animal Stewards, a body of men numbering close on 8,000.

The main objects of the Rural Area Scheme are primarily to render first-aid to injured animals and restore them to full productivity, and secondly, to conserve those killed or fatally wounded as a source of food. Already, some 4,500 casualties have been attended, and of these 15 per cent. have been placed under treatment, 30 per cent. salvaged, and the meat made available for human consumption.

This work of conservation demands prompt action, admits of no delay, and has time and again been executed in the face of personal danger.

The services rendered in this connection by veterinary surgeons, animal stewards, salvage officers and their squads, merit the highest approbation.

Notes on the Reaction of Animals in Air Raids

Horses.—On the outbreak of hostilities, every precaution was taken for the restraint of horses in the streets of cities, but up to the time of writing the use of restraining devices has not been necessary owing to the remarkable manner in which horses have calmly carried on in the unprecedented conditions under which they live and work.

On account of the training the horse has received through mingling with motor traffic and all its attendant noises in the streets of our cities, the falling of the high-explosive bomb has had very little effect upon him, and the animal apparently treats the explosion of the bomb simply as an exaggerated backfire.

Incendiary bombs have set many stables ablaze, and yet horses, whose dread of fire is well recognised, have behaved extremely well.

In the East End of London, 54 horses were removed from a stable through an avenue of flame without injury.

From the blazing stables * of a brewery, 82 horses were evacuated without mishap, and in the Victoria district, where another brewery was set on fire, 45 horses were successfully removed.

In the Coventry district, where the majority of the horses were left out at grass until very late in the season, the animals showed a certain amount of nervousness and galloped about the fields trying to get as far away as possible from both H.E. and incendiary bombs; a nervousness due, no doubt, to the freedom from control and the restraining voice of their drivers.

Cattle.—There have been no reports of cattle stampeding under "blitz" conditions, but some have suffered from nervous disturbance which a diminished milk yield has made apparent. It is alleged that abortion has sometimes resulted.

When high explosives were showered down on an abattoir in one of our large cities, the lairages were wrecked and the doors burst open, allowing the animals to go free. In spite, however, of incessant noise from falling bombs and gunfire, the cattle behaved quietly and were easily herded into safe quarters. Although a good deal of shrapnel was falling, together with tiles from the roof, and quantities of broken glass, no casualties occurred.

Cattle appear to take quite an inquisitive interest in incendiary bombs, and some have been observed nosing round the bombs as they burned.

Pigs.—The report on pigs which were housed in an abattoir, shows that many of them slept sonorously through the night, though the roof over them had been completely wrecked.

In Scotland, large piggeries on a farm were buried beneath debris, and the demolition of the buildings was so complete that it was considered nothing could have remained alive. Nevertheless, a salvage squad, despatched by our Regional Veterinary Officer to the scene, removed the debris, rescued 200 pigs, and although some of them were not recovered for two or three days, not a single casualty was recorded.

A further striking instance of the value of the salvage work carried out amongst pigs may be recorded, in the case of a raid at West Ham where, through the excellence of the work of the salvage squad, 44 out of 91 victims were rendered marketable.

Sheep.—Sheep are rather nervous under bombing and quickly disperse, running hither and thither over the pasture-land. Once the bombing has ceased, no difficulty has been experienced in folding them back again to the yards and enclosures from which they have been driven.

Serious after-effects, however, have been reported, such as abortion in some and symptoms of grave nervous disturbance in others. This nervous disturbance—possibly shell shock—manifests itself in the form of vertigo. One farmer reported that his "sheep went round like dancing Dervishes, and succumbed."

Dogs and Cats.—With the first experience of bombing and gunfire, dogs and cats exhibited some nervousness, but later reports prove that throughout the country pets have accepted the conditions as a matter of course, and have ceased to be alarmed at bombs falling or guns firing.

The remarkable paucity of casualties among the small animals can, in some measure, be accounted for by their acute sense of hearing, and the rapidity with which they take cover, selecting with unerring instinct sheltered places from which they emerge free from harm.

Cats bombed out seem to pick their way out of trouble, and wander more or less leisurely away midst the noise, dust and smoke, eventually returning to sit on the ruins of their former homes.

The Delayed Action Bomb

In the early days of the war on Britain, the time bomb created a state of affairs for which no provision had been made, and temporary accommodation for the animals of evacuees had to be found.

The problem was an extremely difficult one, and its solution was rendered none too easy by the fact that while evacuees hastened to place their animals in the limited available accommodation provided, they did not return to reclaim them. Hence, much congestion occurred, and it was found necessary to require owners to sign a form authorising those in charge of Reception Centres to dispose of their animals if not collected within a period of four days.

In view of the shortage of dog food, a new regulation only admits of the retention of dogs for three days.

* These stables were destroyed by a land mine during a recent "blitz," and 24 of this fine stud were killed outright and many wounded.

Collection of Strays

Provision of suitable accommodation for small animals has now been made available in many towns and cities, and temporary homes are held in readiness for any emergency which may arise.

After a severe and intensive "blitz," the collection of stray dogs and cats is a constant occupation, and while many of these strays are returned to their owners, or are provided with homes, there is always a number to be disposed of humanely.

Cats are the most difficult to retrieve, and so long as they are not suffering or starving the policy is to let them remain and, thanks to a kindly public, many of them are regularly fed.

The destruction of all dogs and cats in a devastated area is to be deprecated for, with the removal of these animals, the area is faced with a vermin plague. It may be remembered that when General Franco was about to enter the devastated city of Madrid during the Spanish Civil War, he found it necessary to send in an army of cats to clear up the vermin and render the city habitable.

Chemical Warfare

Gas Charts issued by N.A.R.P.A.C., which give a full description of war gases and their effects on animals, have been widely distributed, but the following points may be of interest and service to animal owners :—

Harassing "Gases."—Tear "gases," such as C.A.P., K.S.K., B.B.C., and nasal irritants such as D.M., D.A., D.C., do not affect animals, even in high concentrations—apart from sneezing and watery discharge from the nose—and no ill effects follow from exposure.

Blister and Choking "Gases."—Mustard, lewisite, phosgene and chlorine affect animals in much the same way as they do human beings, except that, in the case of arsenical smokes, horses can be worked immediately after exposure.

Horse Respirator.—An effective horse respirator has been evolved at the Government Gas School for the safety of horses working in urban areas. It embraces the upper jaw only, and the bit is not removed when putting it on. This, of course, has been made possible owing to the fact that the horse does not normally breathe through the mouth.

The respirator is a part two-way breathing bag of the humid filter type. The bag proper is composed of a number of layers of impregnated cotton towelling. Two expiratory valves are provided and the gas-tight fit is obtained by means of a sponge rubber fitting band made in four sizes. The respirator weighs 5½ lbs. with haversack.

Compared with the charcoal-box type respirators, this respirator has a short service life. Replacement in the field will involve a new issue—although certain components can be recovered for use again.

It is not suitable for wearing for long periods in hard work because the service time would be seriously reduced by the greatly increased air flow through the filtering material.

Training is necessary to enable the man, impeded by his own mask, to put on the respirator expeditiously on the horse, and for the animal to tolerate it.

Some deterioration takes place during wear even when no "gas" is present in the atmosphere. After six hours continuous use at light exercise, the respirator still affords protection.

Gas Masks.—There are, so far, no satisfactory gas masks for other animals. All sorts of contraptions have been submitted for testing, such as grey flannel bags to be drawn over the entire head of the dog, and saturated with a protective solution. There has also been recommended the internal administration of charcoal to dogs and cats in the false belief that it would protect them from war "gases."

In the case of dog masks, there are many difficulties to be overcome. In the first place, to get the animal to tolerate the mask. Secondly, there are the various shapes and sizes of dogs' heads which would necessitate a large number of different sized masks, *e.g.*, Pekingese, Terrier, Chow, Mastiff.

By the application of a mask, air hunger is increased by the gradual over-loading of the blood with carbonic acid, producing loss of the sense of smell, dullness of hearing and sight, and loss of the sense of direction.

The sense of smell is the guiding sense of the dog, which is completely excluded by the application of a respirator.

Gasproof kennels are on the market, and these are in some cases very ingeniously made, but with one or two exceptions the exchange of air is dependent upon bellows worked from outside, and the danger exists that, should emergency arise, the person operating the bellows might become incapacitated and the dog left imprisoned.

A kennel can be improvised by using a large, roomy box, throwing over the front of it a blanket or similar material saturated in a weak solution of sodium hypochlorite. (A weak solution is approximately one ounce of the hypochlorite to a gallon of water.)

A word of warning may not be out of place here in respect to the use of permanganate of potash as a decontaminator. This agent is serviceable, but only provided that it is freshly prepared as a solution and in such a strength as to produce a deep port wine coloration. As the water in the solution affords in itself a measure of protection, the cloth or blanket should be thoroughly saturated and then hung over the front of the kennel or box.

Further, a box with an air capacity of 35 cubic feet will maintain a dog of 50 lb. weight for two hours without discomfort or inconvenience. This box would be also suitable for cats or cage birds.

The application of bleaching powder (chloride of lime) for the protection of cats and birds is strongly deprecated, as cats and birds are peculiarly susceptible to the fumes of chlorine.

In place of bleaching powder or sodium hypochlorite, chloramine T, in the strength of one ounce to the gallon of water, may be used to saturate blankets or cloths for the protection of cats and cage birds.

Chloramine T, being a comparatively stable compound, only emits chlorine in harmless quantity.

As a last general hint, owners should not only practise wearing their gas masks themselves for their own sakes, but by so doing they will accustom their pets to their changed appearance and muffled voice.

A striking example of the necessity for this precaution is afforded by the unfortunate experience of a lady—the possessor of a terrier—who put on her mask and went down on all fours to play with her pet. The dog promptly bolted and has not been seen since.

GALLOPING BACK?

"With the threat of reduced supplies of tractor vapourising oil to add to our labour shortage difficulties, it looks as though the old 'hoss' might stage a galloping comeback," writes the Editor in *The Farmers' Weekly*. "In any event there is some useful horse-flesh still about. We can feed a horse on the stuff we grow—but you can't grow stuff to keep a tractor off the hunger line. The trend of things is reflected in prices for ordinary working horses. At some of the recent sales in Lincolnshire, for instance, single horses were changing hands at around the 60, 65 and 70 guinea mark, and it wouldn't surprise me if they went up to the 100 guineas which was no unusual figure in the days between 1916 and 1918, when any old screw would make 50 guineas. Even in these topsy-turvy days, it is a curious contrast to realise that while the ordinary carthorse can realise such a figure, racehorses, with pedigrees as long as a street, are going for a mere song. Perhaps it's only justice, for the breeding industry has long been under the weather."

IN PARLIAMENT

The following are among the questions and answers recently recorded on the House of Commons:—

Herds (Culling)

Sir G. Jeffreys asked the Minister of Agriculture when he proposes to consider, with a view to the adoption, or abstention from adoption, of compulsory methods, the result of the working of the voluntary system under which farmers and dairymen are asked to reduce their herds by 5 per cent., and to kill beef beasts up to an aggregate total of some 300,000?

Mr. Hudson: Under the instructions issued to county war agricultural executive committees their district representatives will, in the course of the visits to farms that are being undertaken during the next two months in connection with next season's ploughing-up campaign, discuss with the farmer the culling of his cattle. Where a farmer is unwilling to cull unsuitable animals, a report will be made to the executive committee with a view to the exercise, if necessary, of compulsory powers after inspection of the farmer's stock by members of expert panels which are being appointed in each county for this purpose. The object of this plan is to weed out from our herds inferior and unthrifty animals that are not worth their keep rather than to achieve the slaughter of any particular number of stock.

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Farm Survey

Lieut.-Colonel Acland-Troyte asked the Minister of Agriculture whether, in view of the fact that his farm survey contains a large proportion of questions which have no connection with food production during the war, he can state the object for which it is being made; and, as it will entail a large amount of work for agricultural committees, will he consider postponing the survey until after the war?

Mr. Hudson: The Farm Survey has a two-fold object—to assist in the prosecution of the war and at the same time to collect information for use in the preparation of our post-war agricultural policy. I do not agree with my hon. and gallant Friend that the proportion of questions which have no connection with food production during war-time is large, but certain questions are intended to relate to long-term considerations. The survey made in a great hurry last year has proved of inestimable value to our food production campaign. It would in any case have been necessary to revise it and bring it up to date this year. I felt that the opportunity it provided for collecting additional information of a more general character should not be missed. I cannot agree to the postponement of the survey until after the war. What I am most anxious to avoid is that we should reach the post-war period of reconstruction without that body of factual information which to-day is non-existent and which, in my view, is essential to the formulation of an equitable and stable post-war agricultural policy.

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Military Service (Medical Students)

Mr. Groves asked the Minister of Labour whether all persons who have been admitted, or duly accepted for admission, as students by recognised medical schools are, subject to certain conditions, reserved from military service, irrespective of age; and, if not, what is the maximum age of reservation for such students?

Mr. E. Bevin: Subject to the conditions of satisfactory progress in their studies and the performance of part-time national service, a medical student (being a person who has been admitted or duly accepted for admission as a student by a recognised medical school, *i.e.*, the faculty of medicine of a university, or a school of medicine providing courses of study recognised by a licensing body) is reserved at all ages from military service.

Deer, Scotland

Mr. Mathers asked the Secretary of State for Scotland whether it is the practice of Scottish farmers and flockmasters to regard deer as vermin, destructive of crops and productive of disease amongst sheep; what steps are now being taken to deal with this menace; whether instructions have been issued to County Agricultural Executive Committees; and who is responsible for seeing that these instructions are complied with?

The Under-Secretary of State for Scotland (Mr. Westwood): Yes, Sir. Deer on agricultural land are regarded as harmful to crops and pasture. As explained to my hon. Friend in reply to his Question of May 27th, occupiers of agricultural holdings in Scotland are empowered to take and kill deer found on any arable, garden, or grassland forming part of the holding, and Agricultural Executive Committees may authorise the killing of deer on any land for the purpose of preventing damage to crops. My right hon. Friend is responsible for seeing that the powers delegated to Agricultural Executive Committees are properly exercised and detailed instructions on the subject were issued on November 3rd, 1939.

Mr. Mathers: May we have a general assurance that the transference of land from deer forests to agricultural purposes, and the ridding of the land of deer, is being actively pursued?

Mr. Westwood: I can give that assurance. In the year 1940-41, there have already been destroyed 22,000 deer.

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Pigs (Marking)

Sir R. Gower asked the Parliamentary Secretary to the Ministry of Food whether experiments are still being undertaken by his Department with a view to alleviating the suffering to pigs in connection with the marking of an ear; and what is now the position?

Major Lloyd George: I would refer my hon. Friend to the answer given to the hon. Member for South Kensington (Sir W. Davison) on March 14th, 1940, to which I have nothing to add. I propose to send my hon. Friend a copy of a memorandum which has been prepared on the subject, and which, I hope, will convince him that the ear-marking of pigs is not a cruel practice.

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Olson reports two definite types of dog blood: one group comparable to the A.B. type in humans (Landsteiner) because the cells are agglutinated by all plasmas of all other possible groups while the plasma agglutinates no other cells, and a second group comparable to the O type. There is also an intermediate group consisting of two or more groups which are at present unseparated.

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Northern Rhodesia (Development)

Mr. Creech Jones asked the Under-Secretary of State for the Colonies whether the sum of £296,000 to be contributed by the Northern Rhodesian Government to the British Exchequer in 1941 can be treated as a trust fund for the economic and social development of the territory in the interest of the African people; and whether more funds can be made available for campaigning against the tsetse fly, disease, soil erosion and other ills that affect the African people?

The Under-Secretary of State for the Colonies (Mr. George Hall): The acceptance by His Majesty's Government of this generous gift will not prejudice the funds available to the Government of Northern Rhodesia for the development of social services. In this connection I would invite my hon. Friend's attention to the reply which I gave to his Question of December 11th, 1940, in which it was stated that it had been decided to proceed in 1941 with the full programme envisaged under the five-year plan. Progress is, however, dependent not so much upon the availability of funds as upon the supply of personnel and materials. I may add that, in addition to making full provision for the five-year plan, it is

(*Continued at foot of column* 1, *page* 392.)

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

July 9th.—Meeting of N.V.M.A. "Dalrymple-Champneys" Prize Committee, 36, Gordon Square, 12 noon.

July 9th.—Meeting of Special Committee on the Relationship of the Profession with Manufacturing Chemists,, 36, Gordon Square, 2 p.m.

July 11th.—Annual Summer Meeting of the Lancashire Division, N.V.M.A., at Manchester; luncheon 12.30 p.m. for 1 p.m.

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Supplementary Petrol Rations

We are asked by Mr. H. E. Bywater, Veterinary Liaison Officer for the London Division, to draw the attention of all veterinary surgeons in this division to the letter from the D.P.O. enclosed with the current issue of supplementary petrol coupon units, wherein the urgent need for economy in the use of petrol is again stressed, and a warning is given that a signed statement of mileage covered may have to be produced. Veterinary surgeons are, therefore, advised to keep a log book showing the journeys each day, in order that evidence may be available if required concerning the use of the supplementary ration issued, and also in order to support future applications to the D.P.O.

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PERSONAL

Mr. Peter Henry Hobbs, M.R.C.V.S., who graduated from the London College in October, 1939, has successfully passed out of the 123rd O.C.T.U., Catterick Camp, Yorks, and has been granted a commission in the Royal Artillery.

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R.C.V.S. OBITUARY

Hill, Robert, O.B.E., 16, Cromwell Terrace, Leek, Staffs. Graduated London, July 9th, 1883. Died June 24th, 1941; aged 81 years.

We record above with much regret the death of Mr. Robert Hill, O.B.E., M.R.C.V.S., of Leek, which took place in hospital following several months' illness.

Mr. Hill had been in practice for about 50 years in Leek and Alsager. During the last war, he served as a Captain in the Royal Army Veterinary Corps and was awarded the O.B.E. for his distinguished services.

Mr. Hill, who was married twice, leaves three sons and one daughter, to whom the sympathy of many friends will be extended.

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MINISTRY OF AGRICULTURE NEWS SERVICE

Better Hay: Quality Largely in Farmer's Control.—The first hay is down, and in many districts a transformation has occurred. It remains to make the most of a hay crop that promises to be better than many dared hope. Nothing can be done now to affect its quantity, but quality is largely within the farmer's control. The earlier the cut, the better the hay, with more protein, more minerals, less fibre and higher digestibility. That is the hay that saves the oilcake. So, if in doubt, cut early.

The hay harvest is largely mechanised now, and this has caused a tendency to cut large areas at a time and to leave the crop on the ground until it is dry enough to be swept to the stack. But cut hay unduly exposed loses colour and sheds its leaf. A good crop cut too extensively can be practically ruined in a wet spell. Drying can be speeded up and the hay secured more quickly by shaking up immediately after cutting, and again in 24 hours; or by turning, putting up in windrows overnight and re-turning next morning. Hay dries more quickly after early turning; windrowing overnight causes it to absorb less moisture when the dew falls.

Rarely do we get out of a haystack as much as three-quarters of the food that was standing in the hayfield. Nearly half may be lost in a poor season, and, on an average, probably about one-third of the value of the standing crop disappears somewhere. Some of the food value is used up by the plants themselves, that do not die immediately they are cut, but live and breathe, and in living use up some of their own sugar. Every shower of rain washes out some food material, and there is loss by handling. When dry hay is knocked about some of the leaf is broken off, and leaf, of course, is better food than the stem. It is important, therefore, to handle hay as little as possible and to treat it as gently as possible. The knocking about hay sometimes gets from those who use modern haymaking machinery somewhat impulsively may account for the belief that we no longer make such good hay as our grandfathers. But also goodness is lost when ricks get warm. When the stack gets really hot, the loss is considerable, for the hay really is burning. It is not the coarse, woody fibre that is burning, but the valuable part of the hay, the sugar and starch and other highly digestible substances.

The old belief that it is good to see the stack "warming up well" is one of the few old sayings that has no truth in it. The heat that is given out is just sheer waste. It may be that stock often prefer hay that has been warm in the stack. But, as Professor Scott Watson recently pointed out in a broadcast talk on this subject, animals are like children and do not always know what is good for them. He contended that green hay that has never heated will give more milk every time than the dark, sweet-smelling stuff that has got pretty hot in the rick.

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CHRONIC MASTITIS

The paramount importance of bovine mastitis as a subject of veterinary interest makes the reading of the following article on chronic mastitis in the human female thought-provoking. We hope to refer to the possible relationship next week in an extended review.

"The dependence of mammary growth and function on hormones has been amply demonstrated by experiment," said the *Lancet* in an article appearing towards the end of last year, which continued: "The gonadal hormones, and artificial compounds with similar biological properties, are readily available and by their means the physiological activities of the mamma can be largely controlled. Clinicians have hoped, not unreasonably, that some of the pathological activities might be controlled by the same means. Changes closely resembling those of chronic mastitis in women can be produced in animals by oestrogens.[1] In women the exacerbation of pain and lumpiness in the mamma about the time of ovulation—

(1) Goormaghtigh, N., and Amerlinck, A. *Bull. Cancer*, 1930, 19, 527; Lacassagne, A. *C.R. Acad. Sci. Paris*, 1932, 195, 630; Burrows, H. *Brit. J. Surg.*, 1935, 23, 191.

estimated that by the end of the year the territory's surplus assets and the reserve fund will amount to nearly £1,600,000.

Mr. Creech Jones: Will my hon. Friend give special attention to this aspect of Colonial finance, as it is vitally important; and are steps being taken to build up reserves rather than to dissipate them, particularly in the case of Colonies for whose products the demand is likely to slump after the war, and where the social services at the present time are in a very rudimentary form?

Mr. Hall: In the case of Northern Rhodesia, the surplus has been doubled during the last two years.

that is to say when the output of oestrogen is at a maximum—leaves little doubt, when considered with knowledge derived from experiments on animals, that so-called chronic mastitis in women is attributable to a relative excess of oestrogen. One method of diminishing the output of oestrogen by the ovary is to supply testosterone, which reduces the output of gonadotrophin from the pituitary. Unfortunately androgens given in amounts sufficient to relieve mammary discomfort may have other effects which are undesirable.

"On another page Atkins gives in detail the results of treating 34 patients with testosterone propionate given by injection in doses usually exceeding 400 mg. during four weeks. Among these 34 patients 25 were benefited by the treatment so far as the breast condition was concerned, but hairiness, amenorrhoea and deepening of the voice were noted in eight and menstruation was upset in others. In the goat and rabbit oestogens have been found to be most effective when applied directly to the mamma.[2] MacBryde[3] made a similar observation in women. Spence has used this knowledge in his treatment of women with chronic mastitis. To eliminate psychological effects he first gave his patients, unknown to them, an inert ointment which they used for a month. The symptoms continued under this treatment and an ointment containing testosterone or its propionate was then substituted, a regulated amount being rubbed into the mamma every night. The doses of hormone so used ranged from 4 to 10 mg. a day, thus being considerably less than would be effective if given by injection. The eight women treated in this way were all relieved of mammary pain, and none of them developed hairiness or amenorrhoea. Oestrogens appear to affect the mamma indirectly through their action on the pituitary. In spite of this fact there is experimental evidence that their action on the mamma is greatest when they are applied locally. From Spence's observations it would appear that the same is true of testosterone. Oddly enough, in view of what is known of the causation of chronic mastitis, beneficial results have been claimed for its treatment with oestrogen, but of the 33 cases treated by Atkins with oestradiol benzoate or stilboestrol 15 were rendered worse, amelioration was claimed by only 4, and 14 were unchanged. These results are in accord with expectations based on experimental knowledge.

"The new work affords valuable guidance in the treatment of a condition which has been distressing to both patients and their doctors, for it shows a definite prospect of combating the symptoms by testosterone. A useful step now would be to improve the nomenclature. The machinery of the mind is impeded every time one is compelled by custom to apply the term mastitis to breast changes which we know are not mastitis. The pathology being now known, there is every reason for adopting the term 'oestrogenic mastopathy' or some more euphonious version of it."

(2) de Fremery, P. *J. Physiol.* 1936, 87, 50 P. Lyons, W. R., and Sako, Y. *Proc. Soc. exp. Biol.*, 1940, 47, 398.
(3) MacBryde, C. M. *J. Amer. med. Ass.*, 1939, 112, 1045.

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TRICHINIASIS IN MAN

At a meeting of the Section of Epidemiology and State Medicine of the Royal Society of Medicine on May 23rd, with Dr. J. A. Glover in the chair, the subject of discussion was "Factors Influencing the Presence of Trichiniasis in Man."

Aetiology and Clinical Features

Dr. P. B. Beeson, of Harvard University, said that few cases of trichiniasis had been recognised in Great Britain until recently, but the disease was fairly widespread in many temperate regions, being commonest perhaps in the United States, but very well known also in Germany and Poland. The parasite *Trichinella spiralis* had been known for over a century, and as far back as 1860 trichiniasis was shown to be responsible for severe clinical illness in man, and it was discovered that the disease was contracted by eating the pork of infested swine. Almost any animal which ate meat was liable to the disease, and it had been discovered in at least 25 different species. But beef, mutton, poultry, and fish did not come from animals liable to contract the disease. In the United States, where up to 5 per cent. of swine had trichiniasis, the chief factor responsible was the feeding of swine with uncooked garbage. In Britain there was little opportunity for this means of swine infestation, and the probability was that the rare cases of swine infestation which did occur in this country were acquired by eating infested rats. Trichiniasis had been found in rats in several areas.

Within the past few months several human outbreaks had been reported in different parts of England and Wales and had evoked a new interest in the clinical and epidemiological aspects of the disease. Since the beginning of this year over 200 cases of fairly severe illness due to trichiniasis had been recorded. Sausage appeared to have been the meat responsible for these local epidemics. Rationing of meat and changes in the composition of sausages had brought about a condition whereby an unusually large number of people ate the meat of a single animal. Furthermore, in view of the fact that a partially protective immunity developed after the attack of trichiniasis, the comparative susceptibility of the British population might have led to the development of more clinical cases than would have resulted from similar exposure of a population previously exposed.

Cooking was a certain means of killing any parasites which might be present in meat, but it might be inferred from the number of cases which had resulted from the eating of sausage that the temperature level necessary for the killing of the parasite was not always obtained in the frying of sausage. Ham and bacon were less dangerous because they underwent some preliminary process of salting or smoking. Refrigeration was not such a certain means of killing the parasite.

During the process of digestion the larvae were set free in the upper part of the small intestine. Here the parasite matured and copulated, the female burrowing into the bowel wall and releasing the embryos, which went into the blood stream and eventually found lodgment, perhaps in the muscles, where they might live for many years, or in the brain, heart, or lungs, where they usually excited a rather acute inflammatory reaction which succeeded in killing the parasite. The clinical syndrome had four cardinal features—fever, oedema of the orbit, eosinophilia varying from 15 to 40 per cent., and muscle pain, often very severe, most prominent at the back of the neck, around the elbows, in the lower part of the back, and in the calves of the legs. Irritation in the lungs could produce a clinical resemblance to pneumonia. Clinical recovery usually began about the second or third week. Complete recovery was the rule. Clinical manifestations were confined to the earlier period of the infestation. Many more cases of latent trichiniasis than of the clinical disease were recognised. Two important factors influencing the clinical manifestations were the size of the infecting dose of the parasite and the resistance or susceptibility of the host. The size of the infecting dose was perhaps more important in this parasitic disease than in bacterial and virus diseases, because there was no possibility of multiplication in the body of the host. Once the female had deposited its embryos no further reproduction could take place. The disease which resulted depended upon the reaction of the individual to the invasion.

In a group of six persons all of whom had had apparently the same amount of contaminated meat, four might be entirely well, one mildly ill for three or four days, and the sixth suffer from severe illness lasting for weeks. It had been shown in the case of animals that one infestation protected to a considerable extent against subsequent infestations. The clinical cases in the United States numbered about 600 in a year. In this country there

had lately been three outbreaks in different towns with 50 or more cases in each, and it was likely that many hundreds of other persons were mildly ill at the same time. The only factor which seemed partly to explain why the disease should crop up at the present time was the killing of older sows for sausage meat, such sows being more likely to have been infested than the younger pigs. The most important measures of prevention were to warn the public against the dangers of eating raw or underdone pork and to intensify the campaign against rats.

Sources of Infection

Professor R. T. Leiper agreed with Dr. Beeson that the cause of recent outbreaks was not the rearing of pigs on swill; at the same time, the widespread collection of garbage was a danger to this country. At Wolverhampton, where there had been an outbreak, an examination of 145 rats brought in by the rat-catchers showed two to be positive. At Penrith 164 rats were examined and nine were found to be infested; all the infested rats had been caught at the refuse dumps, none of those caught at the sewage works were infested. He gave figures for trichiniasis in Germany in recent years. In 1922, for example, 110 cases were notified, with one death; in 1930, 95 cases with 13 deaths; in 1934, 44 cases with one death. Swine infestation in the Dutch East Indies was interesting; here from 5 to 7 per cent. of female pigs were infested, and very few male pigs, but in the Dutch East Indies, although the dog was markedly susceptible, there was no recorded trichiniasis in man or in the rat. In other parts of the world the susceptibility of the cat was evidenced.

Members of Professor Leiper's "team" and others described special investigations. Miss M. Young gave an account of the examination of cysts in a number of cases coming to necropsy in the Wolverhampton district; the cause of death had been generally some cardiac condition. In six out of 47 such examinations it was evident that there had existed a subclinical infestation with *Trichinella spiralis*, though never diagnosed in the life of the patient. It appeared from her investigation that a certain amount of trichiniasis was endemic in the Black Country. Dr. Phyllis Clapham mentioned some experiments which suggested that the host species played some part in determining the rate at which the female parasite matured and the embryos were liberated. Mr. J. W. G. Leiper described clinical manifestations of trichiniasis in the pig. Dr. W. P. Rogers illustrated the metabolism of rats with trichiniasis, a study which indicated the possibility of a biochemical diagnosis.

Dr. R. H. H. Jolly (M.O.H., Wolverhampton) said that actually there had been 98 cases in Wolverhampton, and the epidemic covered a period of 13 weeks. The source was traced to meat supplied very largely by three wholesale dealers. Should these outbreaks be attributed to the habits of the people or to the fact that there was a residual trichiniasis in the pig farms in that part of the country? He was of opinion that both factors came in. In 280 families in Wolverhampton, or 37 per cent. of those investigated, an admission was obtained that raw sausage was eaten, either by the housewife or by other members of the family.—*B.M.J.*, 1941, June 7th, p. 866.

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SHEEP MAGGOT

"The loss and trouble caused by the maggot of the sheep blow fly are well known to sheep farmers," says the Ministry of Agriculture in a recent announcement, which continues: "The fly season extends from June to September, but sheep are most likely to be attacked during moist warm weather, especially after thunder showers., and they should be carefully watched at such times to ensure early detection and treatment. The fly is attracted by moist soiled fleece and lays its eggs on the fleece. The tail region is most frequently attacked, but other parts, especially the shoulders and loins, are often chosen. Under favourable conditions, maggots may develop within 8 to 12 hours. At first they feed on the surface, but later bore through the skin, causing the sheep to be restless, to stamp the feet, wriggle the tail and bite the affected part. If drastic treatment is not promptly applied, the sheep rapidly loses condition in a few days, more flies are attracted, the wounds are enlarged and finally death results.

Treatment.—A suitable dressing should first be applied to the affected part to ensure that no maggots escape and eventually become flies. The wool round the wound should then be clipped and the maggots removed by hand, care being taken to see that no pockets of maggots are left undetected. The clean wound should then receive a final dressing.

A very satisfactory dressing can be made by mixing 5 parts (by volume) lysol, 4 parts carbon tetrachloride (commercial) and 11 parts household paraffin. One part of this mixture should be diluted with 4 parts of water for use. Other suitable dressings are a 5 per cent. watery solution of zinc sulphate, or 4 per cent. carbolic acid crystals in whale oil, or equal parts of turpentine and rape oil.

Preventive Measures.—These are designed to discourage the breeding of blow flies and to prevent the sheep's fleece from becoming attractive to the fly. Breeding of blow flies is discouraged by prompt and deep burial of all carrion and garbage. If maggots are present, quicklime should also be applied, for untreated maggots still emerge as flies through a considerable depth of soil. Bracken, heather and coarse undergrowth in the neighbourhood of sheep runs should be reduced as much as possible, for they protect the fly from the birds that prey on them and also often conceal carrion. Maggot-traps consisting of carrion bait suspended over a receptacle containing lime and "flowers" of sulphur have been found to give good results when properly tended.

The condition of the sheep's fleece influences the liability to maggot infestation. A moist, soiled fleece is especially liable to attack and steps should, therefore, be taken to avoid scouring or other soiling of the fleece. Worm parasites are a common cause of scouring; the wool in the region of the tail and rump should be clipped to avoid soiling. Discharges from foot-rot frequently soil the fleece and should receive attention. Wounds made at shearing time are likely to attract the fly unless they are properly dressed. During the fly season, low lying wet or moist ground should be avoided as far as possible.

Sheep dipping is commonly practised to protect sheep from fly attack, but unfortunately no agent has been found that will protect for a long period. The use of a dip of the arsenic sulphur type, however, gives a good measure of protection for about three weeks if the bath is kept clean. If the dip is heavily fouled, it will fail in its effect and may even make the fleece more attractive to the fly.

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"How to Make Good Silage"

Under the above title, Messrs. Boots, Ltd., and the Hannah Dairy Research Institute have published a booklet and free copies have been issued to every registered milk producer in Great Britain.

The booklet contains a short introduction and advice based upon experience in silage production by the staff of the Institute, and the remainder of it consists entirely of photographs and notes depicting modern methods of making molassed young grass silage. The booklet should be useful to the farmer who has never made silage and wishes to get practical help and advice.

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The Ministry of Agriculture states that it is no longer necessary, in order to secure enough home-killed meat, for farmers to bring forward sound cattle for slaughter prematurely. The culling of diseased and unthrifty beasts from both the dairy and the beef herds should be proceeded with steadily throughout the summer months.